**All Questions on Normal Distribution**

**1.** A random variable *X* is distributed normally with a mean of 20 and standard deviation 3.

(a) Find P(*X* ≤ 24.5).

(3)

(b) Let P(*X* ≤ *k*) = 0.85.

(i) Represent this information on the following diagram.

 

(ii) Find the value of *k*.

(5)

**2.** Let *X* be normally distributed with mean 100 cm and standard deviation 5 cm.

(a) On the diagram below, shade the region representing P(*X* > 105).

 

(2)

(b) Given that P(*X* < *d*) = P(*X* > 105), find the value of *d*.

(2)

(c) Given that P(*X* > 105) = 0.16 (correct to two significant figures), find P(*d* < *X* < 105).

(2)

(Total 6 marks)

**3.** The heights of certain plants are normally distributed. The plants are classified into three categories.

The shortest 12.92 are in category A.

The tallest 10.38 are in category C.

All the other plants are in category B with heights between *r* cm and *t* cm.

(a) Complete the following diagram to represent this information.



(2)

(b) Given that the mean height is 6.84 cm and the standard deviation 0.25 cm, find the value of *r* and of *t*.

(5)

(Total 7 marks)

**4.** The weights of a group of children are normally distributed with a mean of 22.5 kg and a standard deviation of 2.2 kg.

(a) Write down the probability that a child selected at random has a weight more than 25.8 kg.

(b) Of the group 95 weigh less than k kilograms. Find the value of *k*.

(c) The diagram below shows a normal curve.



 On the diagram, shade the region that represents the following information:

 87 of the children weigh less than 25 kg

(Total 6 marks)

**5.** The heights of a group of students are normally distributed with a mean of 160 cm and a standard deviation of 20 cm.

(a) A student is chosen at random. Find the probability that the student’s height is greater than 180 cm.

(b) In this group of students, 11.9 have heights less than *d* cm. Find the value of *d*.

(Total 6 marks)